
Three New Species of *Actinocephalus* Sano (Eriocaulaceae) from Minas Gerais, Brazil

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ABSTRACT. Three new species of Eriocaulaceae belonging to genus *Actinocephalus* (Körnigke) Sano are recognized: *Actinocephalus aggregatus* F. N. Costa, *A. deflexus* F. N. Costa, and *A. graminifolius* F. N. Costa. These species are endemic to the Serra do Cipó, Minas Gerais, Brazil. They are placed in *Actinocephalus* based on the presence of the inflorescences composed of capitula in umbels, besides other floral and vegetative characteristics common to the genus. Comments about habitat and geographic distribution of the species are also presented.

RESUMO. Três espécies novas de Eriocaulaceae pertencentes ao gênero *Actinocephalus* (Körnigke) Sano são descritas: *Actinocephalus aggregatus* F. N. Costa, *A. deflexus* F. N. Costa e *A. graminifolius* F. N. Costa. Estas espécies são endêmicas da Serra do Cipó, Minas Gerais, Brasil. Elas foram alocadas em *Actinocephalus* baseado na presença de inflorescências compostas por capítulos em umbelas, além de outras características florais e vegetativas comuns ao gênero. Também são apresentados comentários sobre o habitat e a distribuição geográfica das espécies.

Key words: *Actinocephalus*, Brazil, Eriocaulaceae, taxonomy.

Eriocaulaceae are a monocot family with 11 genera and approximately 1200 species (Giulietti & Hensold, 1990; Stützel, 1998). Most species are Neotropical, and the majority of genera and species are concentrated in the mountainous regions of Venezuela and west-central and southeastern Brazil in South America (Giulietti & Hensold, 1990; Hensold, 1991). A major center of species diversity is in the rocky meadows (campos rupestres) of the Cadeia do Espinhaço in the State of Minas Gerais (Giulietti & Hensold, 1990; Hensold & Giulietti, 1991).

Actinocephalus (Körnigke) Sano was proposed by Sano (2004), who elevated *Paepalanthus* sect. *Actinocephalus* (Körnigke) Ruhland to the generic category. According to Sano (2004), the genus *Actinocephalus* can be distinguished from other genera of Eriocaulaceae by the presence of inflorescences with an umbellate arrangement of capitula. Many species

belonging to *Paepalanthus* subsect. *Aphorocaulon* Ruhland, such as *Paepalanthus incanus* (Bongard) Körnigke and *P. phaeocephalus* Ruhland, also have capitula in an umbelliform arrangement, although these inflorescences have been designated as “inflorescences in fascicle” by Ruhland (1903). The species of *P.* subsect. *Aphorocaulon* have other characters similar to *Actinocephalus*, such as presence of paraclades covered by foliage bracts, flowers trimerous, and staminodes squamiform in the pistillate flowers. The similarity between *Actinocephalus* and *P.* subsect. *Aphorocaulon* had been already discussed by Ruhland (1903: 26) and Sano (2004). Research in this subsection is being carried out by me, and the majority of the species belonging to *P.* subsect. *Aphorocaulon* will be included in *Actinocephalus*.

Actinocephalus now comprises 31 species restricted to Brazil, occurring mainly at the Cadeia do Espinhaço of Minas Gerais and Bahia.

Actinocephalus aggregatus F. N. Costa, sp. nov.

TYPE: Brazil, Minas Gerais: Congonhas do Norte, Serra Talhada, acesso por um ramo vicinal à esquerda da estrada para Gouveia, 17 June 2000, F. N. Costa & P. Fiaschi 191 (holotype, SPF; isotypes, B, G, K, MO). Figure 1A–D.

Rhizoma horizontale, multirosulatum. Folia apice comosa, margine longe ciliata, utrinque glabra. Inflorescentia bracteis involucralibus apice intus pilosis.

Perennial herb, 30–41 cm tall; rhizome horizontal to the ground, ramified, numerous rosettes per rhizome. Leaves rosulate, erect, coriaceous, linear, 1.5–3 × 0.1 cm, both surfaces glabrous, apex acute, densely ciliate, margins long ciliate, base sericeo-lanate; paraclades 1.5–9 cm long, 3 mm diam., glabrous; paracladial bracts patent, lanceolate, 1–1.5 × 0.2 cm, both surfaces glabrous, apex acute, mucronulate, margins with long trichomes, mainly at base, base semiamplexicaul, sericeo-lanate. Spathe 3–4.5 cm long, pubescent to glabrous, apex acute; scapes 1 to 7 per paraclade, 22–37 cm long, sericeous with appressed T-shaped trichomes; capitula 1 cm diam.; globose to hemispheric. Involucral bracts

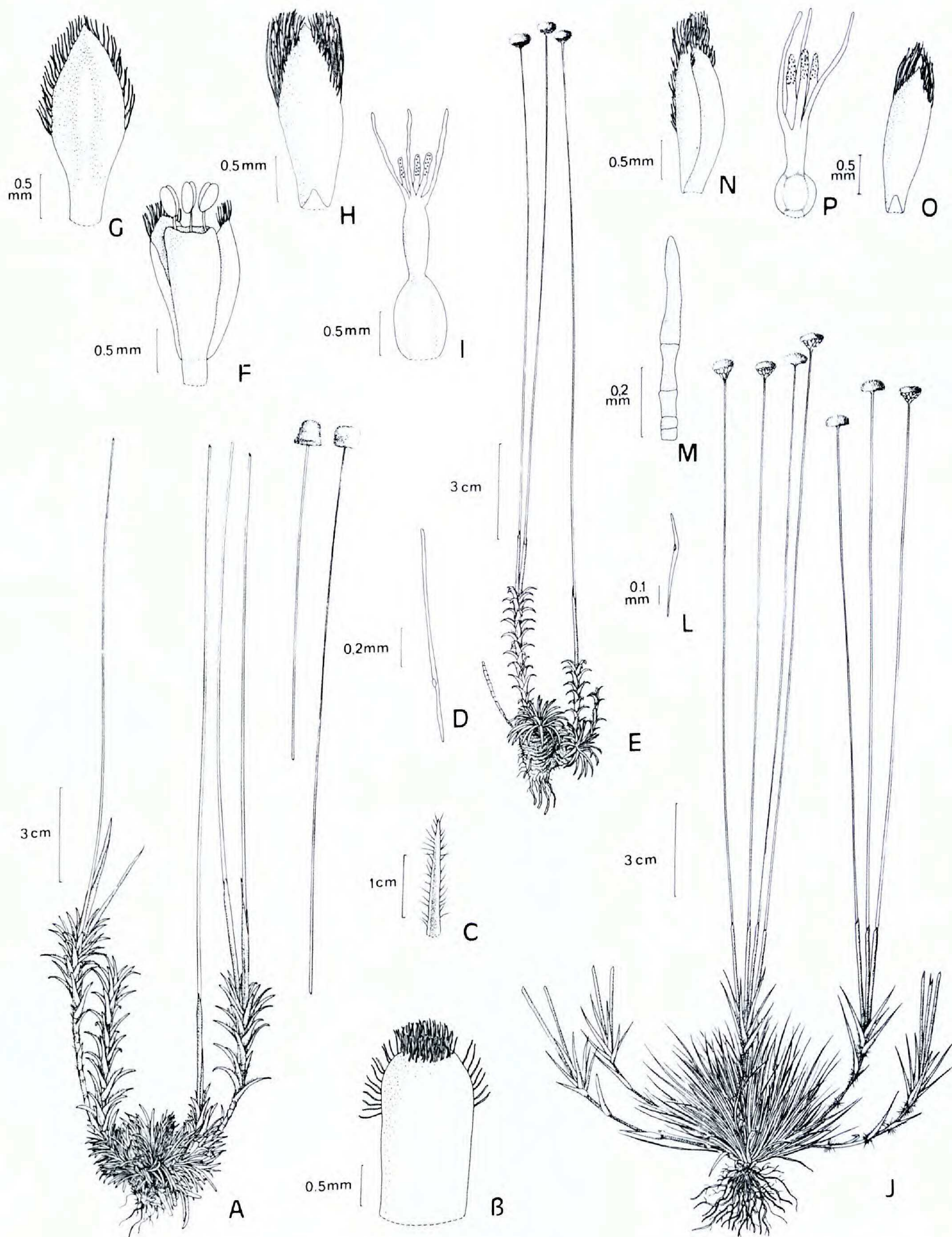


Figure 1. A–D. *Actinocephalus aggregatus* F. N. Costa. —A. Habit showing only one rosette. —B. Adaxial view of involucre bract. —C. Leaf, showing long ciliate margins. —D. T-shaped trichome of scape. Drawn from the type F. N. Costa & P. Fiaschi 191 (SPF). E–I. *Actinocephalus deflexus* F. N. Costa. —E. Habit. —F. Staminate flower with one sepal removed. —G. Adaxial view of sepal of pistillate flower. —H. Adaxial view of petal in pistillate flower showing staminode squamiform. —I. Gynoecium showing styles and appendage. Drawn from the type F. N. Costa & P. Fiaschi 207 (SPF). J–P. *Actinocephalus graminifolius* F. N. Costa. —J. Habit. —L. T-shaped trichome of scape. —M. Trichomes with ornamentation internal of sepal of staminate flower. —N. Sepal of pistillate flower. —O. Adaxial view of petal in pistillate flower showing staminode squamiform. —P. Gynoecium presenting styles and appendages. Drawn from the type F. N. Costa, L. R. Lima, C. A. G. Santos, V. L. Scatena, M. M. Rosa & A. I. Coan 51 (SPF).

brown, oblong, ca. 4×1.7 mm, adaxial surface pubescent at apex, apex obtuse, ciliate at upper margin, trichomes with ornamentation internal; receptacle conical, densely pubescent. Flowers ca. 600 per capitulum, ca. 400 staminate and 200 pistillate within a single capitulum; floral bracts oblong, ca. 2.4×0.3 mm, apex acute, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; staminate flowers ca. 3 mm long; pedicel ca. 0.7 mm long, glabrous; sepals obovate, ca. 2×0.7 mm, apex obtuse, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; corolla tubular, smooth, base of the corolla conspicuously carnose, ca. 2 mm long, 6-lobed; stamens ca. 1.5 mm long; pistillodes with apex covered with papillose trichomes; pistillate flowers ca. 3 mm long, sessile; sepals elliptic, ca. 2.8×0.8 mm, apex acute, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; petals narrowly elliptic, ca. 2.5×0.6 mm, apex acute, abaxial surface densely pubescent, ciliate at upper margin except at apex, trichomes present but without ornamentation internal; staminodes squamiform, opposite petals, ca. 0.2 mm long; appendage ca. 1.2 mm long, cylindrical, apex covered by papillose trichomes.

The diagnostic features of *Actinocephalus aggregatus* are as follows: the presence of numerous aggregate rosettes, rhizomes usually very well developed and horizontal to the ground, leaves with apex densely ciliate and margins with long trichomes, paracladial bracts with margins long ciliate, especially at base, and involucre bracts pubescent at the adaxial surface.

Habitat, distribution, and phenology. *Actinocephalus aggregatus* is restricted to the northern part of Serra do Cipó from 1250 to 1400 m in elevation at the Cadeia do Espinhaço in Minas Gerais. It is rarely collected due to its limited range, which is difficult to access. Flowering specimens were collected in March and June, occurring in campos rupestres.

Etymology. The epithet "aggregatus" is in reference to the numerous aggregate rosettes found in this species.

Paratype. BRAZIL. **Minas Gerais:** Fechados, Serra do Cipó, in valleys of Córrego dos Piões and Córrego Soberbo, ca. 5 km S of Rio Preto. $18^{\circ}53'50''$ – $55'30''$ S, $43^{\circ}44'50''$ – $46'00''$ W, 1250–1400 m alt., 22 Mar. 1982, *N. Hensold 565* (SPF).

Actinocephalus deflexus F. N. Costa, sp. nov.

TYPE: Brazil. Minas Gerais: Santana de Pirapama, Serra do Cipó, Fazenda dos Inhames,

trilha para o alto da serra, ca. $43^{\circ}46'W$, $18^{\circ}57'S$, 20 June 2000, *F. N. Costa & P. Fiaschi 207*, (holotype, SPF; isotype, MO). Figure 1E–I.

Folia deflexa, linearia, supra tomentosa deinde glabrescentia, subtus glabra. Bracteae paracladiales deflexae, trichomatibus longis ad marginem praecipue prope basem.

Perennial herb, 25–38 cm tall; rhizome vertical or horizontal to the ground, ramified, 1 to 3 rosettes per rhizome. Leaves rosulate, deflexed, coriaceous, linear, 0.8 – 1.7×0.1 – 0.2 cm, adaxial surface tomentose to glabrescent, abaxial surface glabrous, apex acute, densely ciliate, margins glabrous, base sericeo-lanate; paraclades 3.0–8.0 cm long, 1.5 mm diam., glabrous; paracladial bracts deflexed, lanceolate to linear, ca. 1×0.1 – 0.2 cm, both surfaces glabrous, apex acute, densely ciliate, margins with long trichomes, mainly at base, base semiamplexicaul, sericeo-lanate. Spathe 2–2.5 cm long, tomentose to glabrescent, apex acute; scapes 1 to 14 per paraclade, 13–31 cm long, sericeous with appressed T-shaped trichomes; capitula 0.7 cm diam., hemispheric; involucre bracts brown, oblong to ovate, ca. 3×1.8 mm, apex obtuse, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; receptacle hemispheric, pubescent. Flowers ca. 132 per capitulum, ca. 108 staminate and 24 pistillate in a single capitulum; floral bracts narrowly oblong, ca. 1.5×0.3 mm, apex acute, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; staminate flowers ca. 2.4 mm long; pedicel ca. 0.7 mm long, glabrous; sepals oblanceolate, ca. 1.6×0.5 mm, apex acute, ciliate at upper margin and densely ciliate at apex, trichomes with ornamentation internal; corolla tubular, smooth, base of the corolla conspicuously carnose, ca. 1.6 mm long, 6-lobed; stamens ca. 1.2 mm long; pistillodes with apex covered with papillose trichomes; pistillate flowers ca. 2.3 mm long, sessile; sepals elliptic, ca. 2×1 mm, apex acute, margins apically ciliate, apex densely ciliate, trichomes with ornamentation internal; petals narrowly elliptic, ca. 2.3×0.6 mm, ciliate at upper margin except at apex, trichomes without ornamentation internal, apex acute; staminodes squamiform, opposite petals, ca. 0.2 mm long; appendage ca. 0.5 mm long, cylindrical, apex covered with papillose trichomes.

Actinocephalus deflexus can be distinguished from other species belonging to genus by the following combination of features: leaves deflexed, linear, adaxial blade surface tomentose to glabrescent, and paracladial bracts that are deflexed with long trichomes at margins.

Habitat, distribution, and phenology. *Actinocephalus deflexus* is restricted to the northern Serra do Cipó at the Cadeia do Espinhaço, Minas Gerais. Flowering noted in April and June in campos rupestres at elevations of 1150–1300 m.

Etymology. The epithet “deflexus” is in reference to the leaves and paracladial bracts deflexed found in this species.

Paratype. BRAZIL. **Minas Gerais:** Fechados, Serra do Cipó, SW of Congonhas do Norte, boundary hillside with sandy brejo below, just S of Rio Preto E of Córrego dos Piões, 22 Apr. 1982, N. Hensold 739 (SPF).

Actinocephalus graminifolius F. N. Costa, sp. nov.

TYPE: Brazil. Minas Gerais: Santana do Riacho, Serra do Cipó, rod. Belo Horizonte–Conceição do Mato Dentro, km 139, um pouco antes da bifurcação, 27 July 1999 (fl), F. N. Costa, L. R. Lima, C. A. G. Santos, V. L. Scatena, M. M. Rosa & A. I. Coan 51 (holotype, SPF; isotypes, B, K, MO). Figure 1J–P.

Rhizoma erectum. Folia erecta, membranacea, linearia. Paracladia tenuia, pubescentia; bracteis paracladialibus linearibus.

Perennial herb, 26–31 cm tall; rhizome vertical to the ground, not ramified, one single rosette per rhizome. Leaves rosulate, erect, membranaceous, linear, 4–7 × 0.1 cm, adaxial surface sericeous to glabrescent, abaxial surface glabrescent, apex acute, margins long ciliate, base sericeo-lanate; paraclades 5–7.5 cm long, 0.8 mm diam., pubescent; paracladial bracts ascending, linear, 1.5–3.5 × 0.1–0.2 cm, indument similar to the leaves, apex acute, margins with long trichome, base semiamplexicaul, sericeo-lanate. Spathe 3–4 cm long, puberulent, apex acute; scapes 2 to 6 per paraclade, 16–26 cm long, sericeous with appressed T-shaped trichomes; capitula 0.6 cm diam., obconic; involucrel bracts brown, oblong-obovate, ca. 2.4 × 1.3 mm, adaxial surface glabrous, abaxial surface glabrescent, apex obtuse, ciliate at upper margin, densely ciliate at apex, trichomes with ornamentation internal; receptacle hemispheric, densely hairy. Flowers ca. 107 per capitulum, ca. 80 staminate and 27 pistillate in a single capitulum; floral bracts oblong, ca. 2 × 0.5 mm, apex acute, ciliate at upper margin, densely ciliate at apex, trichomes with ornamentation internal; staminate flowers ca. 2.6 mm long; pedicel ca. 0.4 mm long, glabrous; sepals obovate, ca. 1.6 × 0.5 mm, apex acute, ciliate at upper margin, densely ciliate at apex, trichomes with ornamentation internal; corolla tubular, smooth, base of the corolla conspicuously carnose, ca. 2 mm long, 6-lobed; stamens ca. 1.5 mm long;

pistillodes with apex covered with papillose trichomes; pistillate flowers ca. 2.2 mm long; sessile or with pedicel ca. 0.5 mm long, glabrous; sepals obovate, ca. 2 × 1 mm, apex acute to rounded, ciliate at upper margin, apex densely ciliate, trichomes with ornamentation internal; petals elliptic, ca. 1.9 × 0.6 mm, ciliate at upper margin except apex, trichomes with ornamentation internal, apex of petal acute; staminodes squamiform, opposite petals, ca. 0.2 mm long; appendage ca. 1 mm long, cylindrical, apex covered with papillose trichomes.

Actinocephalus graminifolius can be distinguished from other species of *Actinocephalus* by the presence of linear and membranaceous leaves and thin paraclades.

Habitat and distribution. *Actinocephalus graminifolius* occurs in campos rupestres, typically among Gramineae, Velloziaceae, Cyperaceae, and other species of Eriocaulaceae, and, at the moment, is known only from the type, collected to the south of Serra do Cipó at the Cadeia do Espinhaço in Minas Gerais.

Etymology. The epithet “graminifolius” is in reference to the long and linear leaves, similar to leaves of Gramineae.

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